

Appln. No. 10/776,715
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Reply to Office Action of February 27, 2007

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Amendments to the Claims:

Please amend the claims as follows. The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently Amended). A method operative for asynchronously mirroring a selected data object from at least one local storage device (SDL) into at least one remote storage device (SDRx), the at least one local storage device being
5 coupled to a first processing facility (HL), and the at least one remote storage device being coupled to a second processing facility (HR), and where the at least one local storage device, the at least one remote storage device, the first and the second processing facility are coupled to a network connectivity
10 comprising pluralities of users, of processing facilities and of storage devices, the method comprising the steps of:

running a mirroring functionality in the first and in the second processing facility, ~~the mirroring functionality~~ comprising:

15 a freeze procedure applied for freezing the selected data object as a source volume (SV), and

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a copy procedure for copying the frozen selected data object into the at least one remote storage device,

creating simultaneously to the application of the freeze and

20 copy procedure a local auxiliary volume in the local storage
device to which updates addressed to the frozen selected data
object are redirected, of a remote volume having a same size as
the frozen source volume in the remote storage device, forming in
the local storage device a resulting source volume including the
25 frozen source volume and the local auxiliary volume, and copying
the frozen source volume to the remote volume,

repeating successively the freeze and copy procedure by
freezing a last created local auxiliary volume and simultaneously
creating a next local auxiliary volume to which updates addressed
30 to the frozen data are redirected, creating a next remote volume,
and adding the last created local auxiliary volume to a last
formed resulting source volume to form a new resulting source
volume, and copying a before last frozen local auxiliary volume
to a last created remote volume,

35 permitting use and updating of the selected data object in parallel to running the mirroring functionality, and

commanding, by default, repeated run of the mirroring functionality for copying updates to the selected data object, unless receiving a command for a mirroring break,

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40 whereby the selected data object residing in the at least one local storage device is copied and sequentially updated into the at least one remote storage device, and whereby auxiliary volumes frozen by successive freeze procedures contain, respectively, successive updates directed to the data object.

Claim 2 (Currently Amended). The method according to Claim 1, wherein the mirroring functionality further comprises:

~~applying the freeze procedure for freezing the selected data object as a source volume (SV),~~

5 creating at least one local auxiliary volume (AVL) to which updates addressed to the selected data object are redirected, ~~each single data object out of the selected data object corresponding to one local auxiliary volume out of the at least one local auxiliary volume,~~

10 creating at least one remote volume in each ~~remote storage device out of the at least one remote storage device,~~ to correspond to each one local auxiliary volume created,

forming in the at least one local storage device, of at least one resulting source volume comprising the frozen selected data object and the at least one local auxiliary volume, [[and]]

15 applying the copy procedure for copying the frozen selected data object from the at least one resulting source volume into the at least one remote storage device, and wherein:

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at time t=0:

20 the source volume containing the data object is created
in the local storage device,

at time t=1:

freezing of the source volume is commanded and a first
local auxiliary volume is created in the local storage device
25 whereto updates to the selected data object are directed,

simultaneously a first remote volume with the same size as
the source volume is created in the remote storage device, the
frozen source volume is copied and written to the first remote
volume, and a first resulting source volume is formed to contain
30 both the source volume and the local auxiliary volume,

at time t=2:

a next freezing command occurs at or after completion
of the copy operation of the source volume to the first remote
volume while simultaneously, the first local auxiliary volume is
35 frozen, a next local auxiliary volume is created in the local
storage device whereto updates to the selected data object are
directed, and a next remote volume is created in the remote
storage device,

the first local auxiliary volume is copied to and written to
40 the next remote volume,

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a next resulting source volume is created and consists of
the first resulting source volume to which is added the next
local auxiliary volume, and

the first local auxiliary volume is copied to the source
45 volume,

at time $t=3$:

a further freezing command occurs at or after
completion of the copy operation of the next auxiliary volume to
the next remote volume while simultaneously, the next local
50 auxiliary volume is frozen, a further local auxiliary volume is
created in the local storage device, and a further remote volume
is created in the remote storage device with the same size as the
further auxiliary volume,

a further resulting source volume is created and consists of
55 the next resulting source volume to which is added the further
local auxiliary volume, and

the next frozen local auxiliary volume is copied to the
further created remote volume.

Claim 3 (Original). The method according to Claim 1,
further comprising:

applying the mirroring functionality simultaneously to more
than one data object.

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Claim 4 (Currently Amended). The method according to ~~any~~
~~one of claims~~ claim 1, [[2 or 3,]] further comprising:

~~mirroring~~ simultaneously mirroring from at least one local
storage device to at least one remote storage device, and
vice-versa.

Claim 5 (Currently Amended). The method according to Claim
2, wherein the mirroring functionality further comprises:

applying the freeze procedure for ~~freezing~~ simultaneously
freezing more than one data object.

Claim 6 (Currently Amended). The method according to Claim
2, wherein the mirroring functionality further comprises:

applying the copy procedure to [[copy]] simultaneously copy
more than one frozen selected data object.

Claim 7 (Currently Amended). The method according to Claim
[[1 or]] 2, further comprising:

~~mirroring~~ simultaneously mirroring one single data object
residing in one local storage device into more than one remote
5 storage device.

Claim 8 (Currently Amended). The method according to Claim
[[1 or]] 2, further comprising:

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~~mirroring~~ simultaneously mirroring more than one single data object from one local storage device into one remote storage device.

Claim 9 (Currently Amended). The method according to Claim [[1 or]] 2, further comprising:

~~mirroring~~ simultaneously mirroring a plurality of single data objects residing respectively in a same plurality of local storage devices into one remote storage device.

Claim 10 (Currently Amended). The method according to Claim [[1 or]] 2, further comprising:

~~mirroring~~ simultaneously mirroring a plurality of single data objects residing in one local storage device respectively into a [[same]] plurality of remote storage devices.

Claim 11 (Currently Amended). The method according to Claim [[1 or]] 2, further comprising:

~~mirroring~~ simultaneously mirroring one single data object residing in each one local storage device out of a plurality of local storage devices into one remote storage device.

Claim 12 (Currently Amended). The method according to Claim 1, wherein mirroring further comprises:

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at a selected point in time:

starting a mirroring cycle,

5 freezing the selected data object,

creating at least one local auxiliary volume (AVL) in the at
least one local storage device (SDL) and at least one remote
volume (RV) in the at least one remote storage device (SDRx),

forming at least one resulting source volume comprising the
10 frozen selected data object and the local auxiliary volume (AVL),
and

after the selected point in time:

copying the frozen selected data object from the resulting
source volume into the at least one remote volume until copying

15 is completed ~~completion of copy,~~

redirecting to the local auxiliary volume [[of]] the updates
addressed to the selected data object,

permitting use of the selected data object during mirroring,
by allowing read and write ~~associative operation~~ operations

20 associated with the resulting source volume, and

repeating a next mirroring cycle by default command, after
completion of [[copy]] copying to the at least one remote storage
device, unless receiving command for mirroring break.

Claim 13 (Currently Amended). The method according to Claim
12, wherein mirroring further comprises:

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starting a next mirroring cycle at a next point in time
occurring after completion of [[copy]] copying to the at least
5 one remote storage device,
freezing the resulting source volume,
creating an ultimate local auxiliary volume in the local
storage device and an ultimate remote volume in the at least one
remote storage device,
10 forming an ultimate resulting source volume comprising the
penultimate resulting source volume and the ultimate local
auxiliary volume , and
after the next point in time:
copying the penultimate local auxiliary volume into the
15 ultimate remote volume, and,
redirecting to the ultimate local auxiliary volume of the
updates addressed to the frozen selected data object,
permitting use of the selected data object during mirroring,
by allowing read and write associative operation operations
20 associated with the ultimate resulting source volume, and
after completion of copy into the ultimate remote volume:
synchronizing the penultimate local auxiliary volume into
the frozen selected data object,
synchronizing the at least one ultimate remote volume into
25 the penultimate remote volume by command of the second processing
facility (HR), and

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repeating, by default command, of a next mirroring cycle after completion of copy to the at least one ~~second~~ remote storage device, unless receiving command for mirroring break.

Claim 14 (Currently Amended). The method according to Claim 13, wherein mirroring further comprises:

selecting still another point in time occurring after completion of copy of the penultimate local auxiliary volume,

5 freezing the resulting source volume,

creating an ultimate local auxiliary volume in the local storage device and an ultimate remote volume in the at least one remote storage device,

forming an ultimate resulting source volume comprising the
10 penultimate resulting source volume and the ultimate local auxiliary volume, and

copying the penultimate local auxiliary volume into the at least one ultimate remote volume,

redirecting to the ultimate local auxiliary volume of
15 updates addressed to the selected data object,

permitting use of the selected data object during mirroring in associative operation with the ultimate resulting source volume,

synchronizing the penultimate local auxiliary volume into
20 the selected data object,

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synchronizing the at least one ultimate remote volume into the penultimate remote volume, and

repeating a next mirroring cycle by default command after completion of [[copy]] copying to the at least one second storage
25 device, unless receiving a command for mirroring break.

Claim 15 (Original). The method according to Claim 14, wherein mirroring further comprises:

storing in the at least one remote storage device of a complete mirrored copy of the selected data object comprising
5 updates entered thereto at the time when copy of the before to penultimate local auxiliary volume was completed.

Claim 16 (Original). The method according to Claim 1, wherein:

mirroring is applicable to a data object selected from the group consisting of data volumes, virtual volumes, data files,
5 system files, application programs, operation systems, data structures, and data base records.

Claim 17 (Original). The method according to Claim 1, wherein:

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mirroring is applicable to a network connectivity selected
from the group consisting of local area networks, wide area
5 networks and storage area networks.

Claim 18 (Original). The method according to Claim 1,
wherein mirroring further comprises:

repeating operation of the mirroring functionality at
discrete repetition intervals of time defined as lasting at least
5 as long as duration of copying of the ultimate local auxiliary
volume to the ultimate remote volume.

Claim 19 (Original). The method according to Claim 1,
wherein mirroring further comprises:

10 synchronizing updates to overwrite the selected data object,
and

synchronizing a later remote volume to overwrite the
penultimate resulting first remote volume.

Claim 20 (Original). The method according to Claim 1,
wherein:

the selected data object comprises a contents span selected
from the group of contents spans consisting of a part of the
5 contents, the whole contents, and more than the contents of the
local storage device.

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Claim 21 (Currently Amended). The method according to Claim 1, wherein mirroring further comprises:

at the local storage device (SDL) at time $t = 1$:

setting a counter to $s = 1$ and creating a local auxiliary

5 volume s ,

freezing the selected data object and comprising the local auxiliary volume s and the frozen selected data object into a resulting source volume s ,

10 permitting use of the frozen data object by allowing read
and write operations associated in association with the resulting source volume s , and

at the at least one remote storage device:

creating at time t of a remote volume s , at least equal in size to the data object, and

15 starting from the time t :

copying the frozen data object from the resulting source volume s into the remote volume s until completion of copy, whereby the data object frozen at time t is mirrored in the at least one remote storage device.

Claim 22 (Currently Amended). The method according to Claim 15, wherein mirroring further comprises:

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at the local storage device at time $t = t + 1$ occurring after completion of copy to the at least one remote storage device:

- 5 a. increasing the counter to $s = s + 1$,
- b. creating a local auxiliary volume s ,
- c. freezing the resulting source volume $s - 1$, and
comprising the local auxiliary volume s and the resulting source
volume $s - 1$ into a resulting virtual volume s , and
- 10 d. permitting use of the selected data object by allowing
read and write operations associated in association with the
resulting $[[local]]$ source volume s , and
at the at least one remote storage device :
 - 15 e. creating at time t of a remote volume s at least equal in
size to the source volume, and
starting from the time t :
 - 20 f. copying the local auxiliary volume $s - 1$ from the
resulting source volume s into the remote volume s and completing
copy,
 - 20 g. operating the second processing facility for
synchronization, by overwriting, of the remote volume s onto the
remote volume $s - 1$, and
at the $[[first]]$ local storage device (SDL):
 - 25 h. operating the first processing facility for
synchronizing, by overwriting, of ~~the remote volume s onto the~~

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local auxiliary volume s -1 onto the selected frozen data object,
and

repeating mirroring after completion of step f, by default
repetition of the steps a to h, unless mirroring break is

30 commanded.

Claim 23 (Currently Amended). The method according to Claim
22, wherein:

the local auxiliary volumes, the source volumes and the
remote a volume is volumes are selected from the group consisting
of volumes, virtual or logical volumes, and files.

Claim 24 (Original). The method according to Claim 22,
further comprising:

storing in the at least one remote storage device at the
time t of a complete mirrored copy of the selected data object
5 comprising updates entered thereto at the time t - 2.

Claim 25 (Currently Amended). A system for asynchronously
mirroring a selected data object from at least one local storage
device (SDL) wherein the system comprises at least one
local storage device, at least one remote storage device, a first
5 processing facility and a second processing facility, the at
least one remote storage device (SDRx), the at least one local

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storage device being coupled to [[a]] the first processing facility (HL), and the at least one remote storage device being coupled to [[a]] the second processing facility (HR), and where
10 the at least one local storage device, the at least one remote storage device, the first and the second processing facility are coupled to a network connectivity comprising pluralities of users, of processing facilities and of storage devices, the system comprising:

15 a device for carrying out a mirroring functionality running in the first and in the second processing facility, the mirroring functionality comprising:

a freeze procedure being applied for freezing the selected data object as a source volume, and

20 a copy procedure for copying the frozen selected data object into the at least one remote storage device[[,]]
simultaneously to the application of the freeze and copy procedure creating:

a local auxiliary volume in the local storage device to
25 which updates addressed to the frozen selected data object are redirected, a remote volume having a same size as the frozen source volume in the remote storage device, forming in the local storage device of a resulting source volume including the frozen source volume and the local auxiliary volume, and copying the
30 frozen source volume to the remote volume,

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successively repeating the freeze and copy procedure by
freezing the last created local auxiliary volume and
simultaneously creating a next local auxiliary volume to which
updates addressed to the frozen data are redirected, creating a
35 next remote volume, and adding the last created local auxiliary
volume to the last formed resulting source volume to form a new
resulting source volume, and copying the before last frozen local
auxiliary volume to the last created remote volume,

the selected data object being used and updated in parallel
40 to running of the mirroring functionality, and

the mirroring functionality being run by default command,
for copying updates to the selected data object, unless receiving
command for mirroring break,
whereby the selected data object residing in the at least one
45 local storage device is copied and sequentially updated into the
at least one remote storage device, and whereby auxiliary volumes
frozen by successive freeze procedures contain, respectively,
successive updates directed to the data object.

Claim 26 (Currently Amended). The system according to Claim
25, wherein the mirroring functionality further comprises:

~~the freeze procedure being applied for freezing the selected~~
~~data object as a source volume (SV),~~

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5 at least one local auxiliary volume (AVL) to which updates addressed to the selected data object are redirected, ~~each single data object out of the selected data object corresponding to one local auxiliary volume out of the~~ at least one local auxiliary volume,

10 at least one remote volume being created in ~~each remote storage device out of the~~ at least one remote storage device, to correspond to each one local auxiliary volume created,

a resulting source volume being formed in the at least one local storage device to comprise the frozen selected data object
15 and the at least one local auxiliary volume, and

the copy procedure being applied for copying the frozen selected data object from the resulting at least one resulting volume into the at least one remote storage device, and wherein:

at time t=0:

20 the source volume containing the data object is created in the local storage device,

at time t=1:

freeze of the source volume is commanded and a first local auxiliary volume is created in the local storage device
25 whereto updates to the selected data object are directed,

simultaneously a first remote volume with the same size as the source volume is created in the remote storage device, the frozen volume is copied and written to the first remote volume,

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and a first resulting source volume is formed to contain both the
30 source volume and the local auxiliary volume,

at time t=2:

a next freeze command occurs at or after completion of
the copy operation of the source volume to the first remote
volume while simultaneously, the first local auxiliary volume is
35 frozen, a next local volume is created in the local storage
device whereto updates to the selected data object are directed,
and a next remote volume is created in the remote storage device,
the first local auxiliary volume is copied to and written to
the next remote volume,

40 a next resulting source volume is created and consists of
the first resulting source volume to which is added the next
local auxiliary volume, and

the first local auxiliary volume is copied to the source
volume,

45 at time t=3:

a further freeze command occurs at or after completion
of the copy operation of the next auxiliary volume to the next
remote volume while simultaneously, the next local auxiliary
volume is frozen, a further local auxiliary volume is created in
50 the local storage device, and a further remote volume is created
in the remote storage device with the same size as the further
auxiliary volume,

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a further resulting source volume is created and consists of
the next resulting source volume to which is added the further
55 local auxiliary volume, and
the next frozen local auxiliary volume is copied to the
further created remote volume.

Claim 27 (Original). The system according to Claim 25,
further comprising:

the mirroring functionality being applied simultaneously to
more than one data object.

Claim 28 (Currently Amended). The system according to any
~~one of Claims~~ claim 25, [[26 or 27,]] further comprising:

the mirroring functionality being configured to mirror from
at least one local storage device to at least one remote storage
5 device, and vice-versa.

Claim 29 (Original). The system according to Claim 26,
further comprising:

the freeze procedure being applied for freezing
simultaneously more than one data object.

Claim 30 (Original). The system according to Claim 26,
further comprising:

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the copy procedure being applied to copy simultaneously more than one frozen selected data object.

Claim 31 (Currently Amended). The system according to Claim [[25 or]] 26, wherein the mirroring functionality further comprises:

5 a configuration for simultaneous mirroring of one single data object residing in one local storage device into more than one remote storage device.

Claim 32 (Currently Amended). The system according to Claim [[25 or]] 26, wherein the mirroring functionality further comprises:

5 a configuration for mirroring of more than one single data object simultaneously from one local storage device into one remote storage device.

Claim 33 (Currently Amended). The system according to Claim [[25 or]] 26, wherein the mirroring functionality further comprises:

5 a configuration for mirroring simultaneously a plurality of single data objects residing respectively in a same plurality of local storage devices into one remote storage device.

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Claim 34 (Currently Amended). The system according to Claim
[[25 or]] 26, wherein the mirroring functionality further
comprises:

a configuration for mirroring simultaneously a plurality of
5 single data objects residing in one local storage device
respectively into a [[same]] plurality of remote storage devices.

Claim 35 (Currently Amended). The system according to Claim
[[25 or]] 26, wherein the mirroring functionality further
comprises:

a configuration for mirroring simultaneously one single data
5 object residing in each one local storage device out of a
plurality of local storage devices into one remote storage
device.

Claim 36 (Currently Amended). The system according to Claim
25, wherein mirroring further comprises:
at a selected point in time:

a mirroring cycle being started,
5 the selected data object being frozen,
at least one local auxiliary volume (AVL) being created in
the at least one local storage device and at least one remote
volume (RV) being created in the at least one remote storage
device,

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10 at least one resulting source volume being formed to
comprise the frozen selected data object and the local auxiliary
volume, and
after the selected point in time:

the frozen selected data object being copied from the
15 resulting source volume into the at least one remote volume until
completion of copy,

the updates addressed to the selected data object being
redirected to the local auxiliary volume,

use of the selected data object being permitted during
20 mirroring, by allowing read and write operations associated
~~associative operation~~ with the resulting source volume, and
a next mirroring cycle being repeated by default command,
after completion of copy to the at least one remote storage
device, unless receiving command for mirroring break.

Claim 37 (Currently Amended). The system according to Claim
36, wherein mirroring further comprises:

a next mirroring cycle starting at a next point in time
occurring after completion of copy to the at least one remote
5 storage device, and

the resulting source volume being frozen,

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an ultimate local auxiliary volume being created in the local storage device and an ultimate remote volume being created in the at least one remote storage device,

10 an ultimate resulting source volume being formed to consist of the penultimate resulting source volume and of the ultimate local auxiliary volume, and
after the next point in time:

the penultimate local auxiliary volume being copied into the
15 ultimate remote volume, and,

the updates addressed to the selected data object being redirected to the ultimate local auxiliary volume in the ultimate resulting source volume,

the selected data object being permitted for use during
20 mirroring by allowing read and write operations associated
~~associative operation~~ with the ultimate resulting source volume
and,

after completion of copy into the ultimate remote volume:

the penultimate local auxiliary volume being synchronized
25 into the frozen selected data object,

the at least one ultimate remote volume being synchronized into the penultimate remote volume by command of the ~~remote~~
second processing facility (HR), and

a next mirroring cycle being repeated, by default command
30 after completion of copy to the at least one ~~second~~ remote

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storage device (SDR), unless a command for mirroring break is received.

Claim 38 (Original). The system according to Claim 37, wherein mirroring further comprises:

a still another point in time occurring after completion of copy of the penultimate auxiliary volume being selected,

5 the resulting source volume being frozen,

an ultimate local auxiliary volume being created in the local storage device and an ultimate remote volume being created in the at least one second storage device,

an ultimate resulting source volume being formed to comprise
10 the penultimate resulting source volume and the ultimate local auxiliary volume, and

the penultimate local auxiliary volume being copied into the at least one ultimate remote volume,

the updates addressed to the selected data object being
15 redirected to the ultimate local auxiliary volume in the ultimate resulting source volume,

the selected data object being permitted for use during mirroring in associative operation with the ultimate resulting source volume and,

20 the penultimate local auxiliary volume being synchronized into the selected data object,

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the at least one ultimate remote volume being synchronized
into the penultimate remote volume, and

a next mirroring cycle being repeated by default command
25 after completion of copy to the at least one second storage
device (SDR), unless a command for mirroring break is received.

Claim 39 (Original). The system according to Claim 38,
wherein mirroring further comprises:

the at least one remote storage device storing a complete
mirrored copy of the selected data object comprising updates
5 entered thereto at the time when copy of the before to
penultimate local auxiliary volume was completed.

Claim 40 (Original). The system according to Claim 25,
further comprising:

the mirroring functionality being applicable to a data
object selected from the group consisting of data volumes,
5 virtual volumes, data files, system files, application programs,
operation systems, data structures, and data base records.

Claim 41 (Original). The system according to Claim 25,
further comprising:

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the mirroring functionality being applicable to a network
connectivity selected from the group consisting of local area
5 networks, wide area networks and storage area networks.

Claim 42 (Original). The system according to Claim 25,
further comprising:

the operation of the mirroring functionality being repeated
at discrete repetition intervals of time defined as lasting at
5 least as long as duration of copying of the ultimate local
auxiliary volume to the ultimate remote volume.

Claim 43 (Original). The system according to Claim 25,
further comprising:

the updates being synchronized to overwrite the selected
data object, and
5 a later remote volume being synchronizing to overwrite the
penultimate resulting first remote volume.

Claim 44 (Original). The system according to Claim 25,
further comprising:

the selected data object comprising a contents span selected
from the group of contents spans consisting of a part of the
5 contents, the whole contents, and more than the contents of the
local storage device.

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Claim 45 (Currently Amended). The system according to Claim 25, further comprising:

at the local storage device (SDL) at time $t = 1$:

a mirroring cycle counter being set to $s = 1$ and a local
5 auxiliary volume s being created,

the selected data object being frozen and comprising the local auxiliary volume s a resulting source volume s and the frozen selected data object into a resulting source volume s ,

the selected data object being permitted for use by allowing
10 read and write operations associated ~~in association~~ with the resulting source volume s , and

at the at least one remote storage device:

a remote volume s being created at time t , and being at least equal in size to the data object, and
15 starting from the time t :

the frozen data object being copied from the resulting source volume s into the remote volume s until completion of copy,

whereby the data object frozen at time t is mirrored in the at
20 least one remote storage device.

Claim 46 (Currently Amended). The system according to Claim 45, further comprising:

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at the local storage device at time $t = t + 1$ occurring after completion of copy to the at least one remote storage device:

- 5 a. the mirroring cycle counter being increased to $s = s + 1$,
- b. a local auxiliary volume s being created,
- c. the resulting source volume $s - 1$ being frozen, and comprising the local auxiliary volume s and the resulting source volume $s - 1$ into a resulting ~~virtual~~ source volume s , and
- 10 d. the selected data object being permitted for use by allowing read and write operations associated ~~in association~~ with the resulting local volume s , and at the at least one remote storage device:
 - e. a remote volume s being created at time t with a size at
 - 15 least equal to the size of the source volume, and starting from the time t :
 - f. the local auxiliary volume $s - 1$ being copied from the resulting source volume s into the remote volume s until copy completion,
 - 20 g. the second processing facility being operated for synchronization, by overwriting, of the remote volume s onto the remote volume $s - 1$, and at the first storage device (SDL):
 - h. the first processing facility being operated for
 - 25 synchronization, by overwriting, of ~~the remote volume s onto the~~

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Reply to Office Action of February 27, 2007

local auxiliary volume s -1 onto the frozen selected data object,
and

mirroring being repeated after completion of step f, by
default repetition of the steps a to h, unless mirroring break is
30 commanded.

Claim 47 (Currently Amended). The system according to Claim
46, further comprising:

the local auxiliary volumes, the source volumes and the
remote volumes ~~a volume~~ being selected from the group consisting
of volumes, virtual or logical volumes, and files.

Claim 48 (Original). The system according to Claim 46,
further comprising:

a complete mirrored copy of the selected data object
comprising updates entered thereto at the time $t - 2$ being stored
5 in the at least one remote storage device at time t .